The Stress-Eating Relationship

An Honors Thesis (HONRS 499)

By

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Muncie, Indiana
April 2004

Date of Graduation: May 8, 2004
ACKNOWLEDGEMENTS

I would like to take this opportunity to acknowledge the many people who contributed to this research project. First and foremost, my advisor, Dr. Jay Kandiah, provided a great deal of guidance, encouragement, and assistance throughout the entire project. As an undergraduate, I had no experience conducting research before this, and I am grateful to Dr. Jay for taking me under her wing. Dr. Jay was the person who encouraged me to pursue departmental honors, then offered to be my advisor, and guided me along through every step of the project.

I would also like to extend thanks to the statistician, Dr. Jim Jones. He posted the stress-eating survey online and solved all of the problems that arose during data collection. In addition to performing the statistical analysis, he also provided a great deal of help in interpreting the data, and he proofread my results page for accuracy.

Thank you to all of professors at Ball State that allowed me to use their classes as subjects. I am especially grateful to those professors who offered extra credit to their students as extra encouragement to participate. I was having a lot of difficulty recruiting a sufficient amount of subjects until these professors stepped up.

Finally, thank you to my fiancé, Adam Kruse, for providing support in this project and every other endeavor I undertake. He has encouraged my efforts as if they were the most important things on earth, and he has celebrated my accomplishments as if they were his own.
The purpose of this study was to identify any changes in appetite or food selection that occur among college students when they experience psychological distress. A total of 315 students were surveyed, and 304 of the surveys were usable. The subjects included 280 females, 23 males, and one subject did not indicate gender. A survey was posted on the internet. The survey only allowed access to Ball State University students who have a valid username and password. The survey asked questions including demographics, stress level, typical eating habits and eating habits when stressed. The results indicated that most subjects (79.9%) experience a change in appetite when stressed with over half of the subjects (50.3%) experiencing an increased appetite. Those subjects that experienced an increase in appetite chose significantly more sweet dishes than those who experienced a decreased appetite or no change in appetite. They also chose significantly more mixed dishes than those with a decreased appetite. Although 78.6% of subjects claim they typically try to make healthy eating choices, 60.3% of these subjects do not make the same attempt when stressed. This study found that a larger percentage of women than men claimed to have an increased appetite when stressed while a larger percentage of men than women claimed they experience no change in appetite when stressed. Also, a larger percentage of overweight subjects claimed they
experience an increased appetite when stressed compared to normal weight and underweight subjects. However, neither of these results was significant. This study found no difference in eating habits and food choices between restrained and unrestrained eaters. The information in this study is helpful to health professional who address stress level and/or eating habits in their clients; however, it poses many new questions that require further study.
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CHAPTER ONE

INTRODUCTION

Many factors influence the eating habits of each individual, but most people are only aware of some of these influences. Food is not consumed solely to meet the physiological needs of the individual. If it were, dietitians and nutrition counselors would have an easy job of educating individuals on the most nutritious foods for their body. However, food serves many functions such as to provide satiety, flavor, social activity, cultural tradition, pleasure and comfort (1). Due to these functions, individuals use many factors to determine which foods they will eat, and sometimes the nutritive value of food is cast aside. If food and nutritional experts intend to improve the health of the American public, they must work with professionals to create foods that are not only nutrient dense to meet the physiological needs, but also have sensory acceptability for the consumers.

One important factor that may play into an individual’s food choices is their stress level (2). Many people recognize the comforting features that food can provide, but not everyone can recognize when their stress level is taking a negative toll on their diet. In order for dietitians to help the public recognize this fact, they need to acknowledge that a problem with stress-related eating exists, identify the comfort foods that individuals turn to and find ways to work around the problem. The goal of dietitians and health professionals is to identify stressors that trigger food habits and to educate individuals on the importance of nutrition and health. To accomplish this, they must be able to identify and address the other factors that influence a person’s food selections.
Statement of the Problem

The following question will be studied:

What are the stressors in college students lives, and how does stress influence their eating habits and food choices?

Need for the Study

Dietitians need to fully understand the food choices of the American public in order to help improve their dietary intake. One significant factor that negatively influences the diet of many Americans is stress (3-4). Dietitians need to address over-consumption and poor food choices that tend to accompany stressful periods. They also need to recognize that individuals handle stress differently and use a variety of ways to overcome stress. If dietitians can appropriately identify which groups of people are prone to stress eating, they will be able to provide effective nutrition assessment and counseling. Dietitians need to address the fasting, meal skipping and general loss of appetite that can accompany stress in some people (5). Without adequate research in the area of stress-eating, dietitians will be unable to address these concerns and improve the public’s health.

One group of individuals that are particularly prone to stress is college students (6). The Ball State University counseling center reported that 53.3% of surveyed students were experiencing some level of anxiety and 13.3% of students were experiencing severe to extreme anxiety (7). Stress has many other harmful symptoms in addition to impairing the diet. Stress can cause headaches, fatigue, irritability and lack of motivation (8). College students are of particular interest not just because of their high stress level, but because most are traditional students who are living away from home for
the first time and are becoming responsible for their own meals. This makes it an especially important time to develop a concern for nutrition and healthy eating patterns. Considering the high level of stress and the importance of establishing healthy eating patterns in this population, it is critical that we examine the stress-eating relationship. Dietitians need to understand this relationship to help individuals cope with the obstacles that get in the way of making healthy eating choices. This study is important as it will reveal the types of foods college students seek when they are stressed. By identifying these problems, dietitians will be able to assess and provide nutritional counseling to help improve the overall nutritional status of college students.

Assumptions of the Study

For the purpose of this research, the following assumptions were made:

1. The subjects were literate.
2. The subjects were honest in their responses to the survey.
3. The sample was representative of Ball State University students in Muncie, Indiana.

Limitations of the Study

For the purpose of this study, the following limitations were imposed:

1. The sample selection was limited to currently-enrolled students at Ball State University in Muncie, Indiana.
2. There were not equal male and female participants.
3. A convenience sample was used, not a random sample.
Definition of Terms

The following terms are defined as they will be used in the investigation.

1. Comfort food: a food that provides a sense of ease or relief from stress to the individual that consumes it.

2. Diet: the food and drink that a person regularly consumes.

3. Stress: negative mental or emotional tension; psychological distress.

4. Restrained eaters: individuals who report that it requires great or considerable effort to control their eating. Their diet is characterized by intentional dietary restriction such as narrow range of food choices and limited caloric intake.

5. Unrestrained eaters: people who report that it requires little effort to control their eating.

Objective

The objective of this study was to determine the stressors affecting college students and the effects these stressors have on the students' eating habits. Specifically, the study was designed to identify any changes in appetite or food selection associated with stress among male and female college students.

Hypotheses

H₁ = A majority of students experience a change in appetite during stressful periods in their lives, although there will be differences in whether their appetite increased or decreased.

H₂ = Students identified as restrained eaters will experience an increase in appetite when under stress.
H₃= Women will experience an increased appetite when stressed compared to men, who will experience a decreased appetite or no change in appetite when stressed.

H₄= Obese individuals will experience an increased appetite in response to stress compared to normal weight individuals.
CHAPTER TWO

REVIEW OF LITERATURE

Although many people may recognize the changes that occur in their eating habits when they are experiencing periods of stress, not much conclusive information exists on the stress-eating relationship. There are a wide variety of responses to a stressful stimulus. Some individuals have an increased appetite while others a decreased appetite (5). Some consume more salty snack foods and others eat more hearty, substantial meals (9). Currently, nutrition professionals are forced to help stressed individuals maintain healthy eating habits by relying on their own experiences because adequate scientific research is lacking. This is insufficient due to the wide variety of individual responses to stress. The current literature available on the stress-eating relationship provides an adequate background for further studying this connection.

The purpose of this study is to identify the changes that occur in college students' eating habits when they are experiencing distress. Specifically, the study investigates any changes in appetite or changes in food selection of distressed individuals in the context of their gender, weight, and typical eating patterns. The study also identifies and characterizes the stressors, or causes of stress, and comfort foods chosen by individuals in their regular diet and during periods of high stress. The stress levels of the participants is also determined in this study.

The literature review is divided into the following sections: Stress and the College Student, Comfort Foods, The Stress-Eating Relationship, Summary, and Conclusion.
Stress and the College Student

College students are some of the most stressed people in the nation (10). Counseling centers located on college campuses across the country treat stressed students on a daily basis (10). The Ball State University counseling center reported that over half (53.3%) of surveyed students were experiencing some level of anxiety and 13.3% of students were experiencing severe to extreme anxiety (7).

A wide variety of stressors affect college students including stressors from school, family, work, the environment, personal relationships and countless others (8). Not all stress is considered harmful. Some stress may be a result of happiness or pleasure such as a birth, marriage or job promotion (11). Eustress refers to these “good” stressors that bring satisfaction instead of sorrow. Distress is the type of stress that is most commonly referred to when people use the term stress. Distress refers to the “bad” stressors such as job loss, death and financial troubles that cause unhappiness and despair in a person’s life. Distress and eustress refer to the type of stressor, not the impact of the stressor on the body (11). Stress is a fairly difficult thing to measure; however, many tools have been designed to do just this. It appears that these tests can be categorized into four basic groups.

1. **Stressor tests:** Stressor tests attempt to measure the number of stressors or stressful experiences in the individual’s life (8). They are often based on point systems, and the stressors may be categorized into groups such as family, environment, work, social, etc. While these tests can help recognize the individual’s life situation and their likelihood of feeling stress, it does not always tell of the severity of the stressor. For example, a holiday season and a death of a spouse are both stressors, but one may
evidently cause more stress than the other. Some tests try to compensate for this by ranking life events with a number that gives more points to high-stress events and fewer points for low-stress events. However, an event can vary widely from one situation to the next. For example, a divorce can be mutual, uncomplicated and a source of relief or it can be hostile, resentful, traumatic and involve drawn out custody battles over children. In addition, these tests do not always tell how the individual responds to the stress or how much the stressor affects the individual. A situation such as a wedding may be perceived as enjoyable and relaxing to one person and extremely stressful to another person. Two people may be experiencing the same life event, but one person may have effective stress relief tactics that they employ to help them deal with the stress while the other may not. The availability of stress relief tools (or the perception thereof) can affect the amount of stress an event causes an individual. Therefore, it is necessary to ask a person how much stress they feel due to a particular event (2). This type of questioning that considers the individual’s reaction to stressful situations is used when assessing the stress level of the subjects in this study. Without questioning the level of stress an event causes the individual, this test may merely indicate of the number of hassles in a person’s life, not their level of stress.

2. **Stress symptoms tests**: Another way to measure stress level in an individual is by measuring the number, frequency and severity of specific symptoms that can be related to stress (8,11). These symptoms may be physical symptoms such as perspiration and hyperactivity or behavioral symptoms such as forgetfulness and withdrawal from usual activity. This test has an advantage over the previously mentioned test because it is a better indicator of the stress’s effects on the person. It is more capable of directly
measuring stress rather than just measuring the number of potential stressors. An obvious fault with this type of test is it does not necessarily ensure that all symptoms are stress-related. Outside factors such as health problems, personal situations and the individual’s tolerance of pain may influence the final scores.

3. **Stress balancing tests:** Another way to help identify how much stress a person may be experiencing is by measuring a person’s stress balancing techniques (8). If used in conjunction with a stressors test, it can be a good indicator of overall stress level. It works by looking at an individual’s amount of stress and how able they are to cope with it. These tests are designed to measure how much a person participates in or practices habits that are often associated with or used for stress relief. The test may ask how often an individual exercises, sleeps, eats healthy, relaxes, practices religious or spiritual customs, etc. It may also ask how often an individual participates in unhealthful stress-relief tactics such as smoking, drinking, eating excessively, taking drugs, etc. These tests tend to question the life situation of the individual by asking if they have supportive family or friends, belong to a social group and can effectively manage their time and money.

4. **Personality tests:** Finally, personality tests may help identify specific characteristics or traits that are associated with higher stress levels and an inability to cope well with stress. These types of tests will ask the subjects about their personality, such as do they get irritated easily or try to everything themselves as well as behaviors such as if they procrastinate, are disorganized or neglect their health. Individuals who catastrophize events, make mountains out of molehills or exaggerate the consequences of an action tend to be more stressed than individuals who do not (12). This test may also
ask certain demographic questions to estimate stress level. For example, stress tends to be higher among smokers and individuals with unhealthy weight-control practices and stress increases when income, education, age or weight satisfaction decreases (3). These types of personality questions may also be incorporated into the other types of stress tests. Personality tests are most useful in determining behaviors or characteristics that may potentially cause stress and helping the individual plan a way to manage and cope with their stress.

Although there have been a large number of tests developed to identify stress, there have been an infinitely larger number of tips and ideas generated to help students cope with their stress. University counseling centers across the nation have compiled countless methods for helping students reduce the amount of stress in their lives and cope with the stress that will inevitably occur. Stress reduction and relief may come in many forms.

First, counselors suggest that students try to reduce the amount of stress in their life by making behavior changes (7,11). This type of stress relief prevents stressors from occurring by encouraging the student to properly manage their time, money and priorities. Students are encouraged to be organized and avoid procrastination. Counselors encourage students not to race through the day, but to slow down and enjoy it.

Secondly, counselors suggest that students take care of their bodies (7,11). Students should get plenty of sleep each night and wake up feeling rested and ready to start the day. It also helps to eat a balanced, healthy diet including one that is low in fat, sugar, salt, caffeine and alcohol. Counselors advise that students avoid taking
unnecessary or dangerous drugs including sleeping aids, alcohol, tobacco and caffeine. Many types of exercise are encouraged to help students maintain good health and relieve their stress. Exercise in many forms including stretching, aerobic exercise, shoulder rolls, yoga, and tai chi have all been recommended by professionals. Students should reach and maintain an ideal body weight for optimal health. (8).

In addition, students should use fun and socializing to reduce the stress in their daily lives (7,11). Counselors recommend that students pursue a hobby that will bring them pleasure and allow them to take some time for themselves. Also, students can join an organization, social group or spiritual group in order to make supportive friends. If students learn to give and receive affection, speak openly about feelings, seek help from family, friends or professionals they will be more capable of dealing with their stress. Many university counseling centers suggest using humor to relieve stress. The University of Buffalo posts humor and entertainment on their counseling center website to help students and faculty relieve stress. They post comics, humor, optical illusions, games and crossword puzzles for the students to enjoy (12).

Some of the stress reduction techniques suggested by counseling centers involve having a student work to change the way they think (7,11). Many times a particular situation does not cause stress, but the way the individual responds to the situation causes the stress. If students can think and act in a way that promotes a positive, optimistic view of life’s circumstances, they are less likely to feel “stressed out” in their daily life. Students can accomplish this in part by not setting unrealistic goals for themselves. An inability to reach these goals will only lead to feelings of failure and thus, more stress. Students should identify dangerous ways of thinking and work to correct them. Some
destructive thought patterns include failing to see the humor in a situation, thinking there is only one right way to do something, getting angry easily and keeping everything inside. Students need to combat self-destructive thoughts and irrational thinking because these thoughts can show up in the students’ actions. Some actions that may indicate destructive thought patterns include complaining about the past, gossiping and making a big deal out of everything. Students need to be able to live in the here and now.

Counselors encourage students not to ignore stress symptoms but to be flexible, accept their feelings and be compassionate with themselves and others. It is also important for students to know themselves and their limits and learn to say “no” when they know they can not take on another task (7).

Finally, counselors suggest that students practice relaxation techniques to cope with their stress (7). These can include meditation, prayer, yoga and tai chi. Some specific techniques have been designed to reduce stress such as progressive muscle relaxation, guided imagery, visualization, hypnosis and diaphragmatic breathing. Diaphragmatic breathing requires the student to change how they breathe by taking long, slow, deep breaths that fill the stomach rather than short, shallow breaths that fill the chest. These types of breaths decrease the heart rate and blood pressure by more efficiently oxygenating the blood. This type of deep breathing also triggers the quieting response in your body and distracts from the stressful stimulus. Counselors recommend that students try this several times a day for the best results. (11).

The above recommendations are made by counselors because they are healthy alternatives to stress. Unfortunately, not all students turn to these healthy ways of relieving stress. They may seek out stress relief through excessive eating, drinking,
smoking or drugs (7). Although these methods may provide temporary stress relief to the individual, they are not recommended because of their harmful effects on the body and short-term alleviation of stressful symptoms.

Stress has many effects on the body. Stressors cause symptoms related to stress by inducing the “fight or flight” response that is associated with the sympathetic nervous system of our body. When the stressful stimulus disappears, the parasympathetic nervous system of our body causes the calming effect that follows (13). Students need to identify what is stressful to them (their stressors), how stress affects them, when they are most vulnerable to stress and when stress is good for them. By identifying their stressors, students can work to control them thus reducing the amount of stress in their lives. Stress can affect people in many ways. It can cause sleeping problems, fatigue, agitation, headaches, upset stomach, irritability, mood swings, chest pain, high blood pressure, anxiety and depression among other symptoms. Individuals may also be more vulnerable to stress at different times (11). Students should examine their stress level throughout the day, week, month and year. Stress may be most prevalent at particular times of the day such as right after work or while lying in bed trying to fall asleep. Students may notice that due to their schedule they feel the most stress on particular days of the week like Mondays or Fridays. Stress may be more difficult to handle on particular days of the month such as when the bills are due or during the menstrual cycle. Stress during the year may be most high during holidays, anniversaries or special events (11). It is equally important to determine the stress level that is good for the individual. Too much stress obviously has many consequences, but too little stress may impair performance (11). Without a little pressure from a deadline at work, an individual may not be motivated to
finish a task. The important thing is to be able to identify what level of stress helps the individual and what level hurts the individual.

**Comfort Foods**

The phrase “comfort food” has come to mean basically any food that a person enjoys eating (14). More often, it identifies foods that make a person feel comforted when they are sad or stressed. Food is often associated with emotions in our culture because we use food in so many ways (1). Cake and ice cream is used to celebrate at birthday parties, alcohol is used to socialize, snacks can relieve boredom and comfort foods can help an individual cope with stress. Food has “healing power.” Foods are not just used to cure the sick, but also to comfort the lonely (1). Phrases such as “the quickest way to a man’s heart is through his stomach” indicate that in our society, serving delicious food to another is a way to express gratitude, compassion, friendship and even love (1). Popular phrases such as this one show the value that we place on appetizing food in our society.

There is not one distinct characteristic that describes all comfort foods. They may be creamy or crunchy, hot or cold and high fat or low fat. Previous research has suggested that comfort foods differ across gender and across age, with men preferring hearty meals and women preferring snack foods (9). The characteristics of the comfort food depend merely on the individual’s preferences. The only requirement for a food to bring comfort is that it tastes good. Some researchers have discovered food that tastes pleasing, such as salt and sugar, stimulates the pleasure center in the brain (15). Foods can be comforting for a variety of reasons other than just a pleasant flavor. Foods may be
identified as comforting because of their texture, temperature, nutrient composition (protein, complex or simple carbohydrates, and fat), smell or appearance. Often comfort foods are foods that the individual is used to. These foods can remind the individual of a comforting time or place such as their childhood or their home (16). For example, a person who is traveling abroad may find comfort in a familiar cheeseburger after consuming many new and exotic meals. In addition, a college student away from home for the first time may be comforted by the cafeteria’s meatloaf because it reminds them of their mom’s home-cooked meals. Finally, foods are comforting because physically they feel good to eat. For example, warm soup or hot cocoa feels good in the winter after coming in from the cold (16). Stress may make an individual more prone to poor eating choices because unhealthy foods may offer comfort to relieve the stress. Often the connotation with comfort foods is that they are high in fat or are generally lacking nutrition (4,16). An individual’s vulnerability to poor eating choices depends on the individual, the stress stimulus and the circumstances (15).

The Stress-Eating Relationship

There has been sporadic but inconclusive research on the area of stress eating. Many researchers have found that some individuals eat more in response to stress while others eat less (5,15). Researchers have suggested many different theories to predict the eating habits of individuals and offer explanations for these differences. Researchers have divided those with a decreased appetite and an increased appetite based on the following factors: typical eating patterns (restrained versus unrestrained eaters), gender, and body weight (obese versus normal weight individuals) (2,5). Also, they attempted to
categorize these people to determine why they will respond differently. There are numerous proposals to indicate who will respond to stress through eating.

1. **Restrained vs. Unrestrained Eaters**: The first theory acknowledges differences in eating habits among different types of people, divided into restrained and unrestrained eaters. According to Rutledge and Linden, restrained eaters are those who have the highest rates of dietary concern and self-awareness about body image and weight while unrestrained eaters have the lowest rate of dietary concern and awareness about body image and weight (5). Restrained eaters may exhibit intentional restrictions on eating or even disordered eating. Rutlege and Linden studied the stress-eating relationship in restrained and unrestrained college females (5). Subjects were given a series of challenging cognitive tasks to complete. These tasks had been validated as causing a significant stress response in many previous studies. Salty and sweet snacks were made available to the subjects during the recovery phase while participants completed a brief questionnaire. This study found that restrained eaters tended to increase food intake during periods of stress while unrestrained eaters decreased food intake during stressful periods. According to Rutlege and Linden, the decrease in food intake by the unrestrained group was insignificant, but the increase in food intake by the restrained eaters was much larger. This implies that restrained eaters are more susceptible to stress-induced eating perhaps due to their overly high concern with food. It is also important to note that according to their study, restrained and unrestrained eaters did not physiologically respond differently to stressors. This means the blood pressure, heart rate and positive and negative affect were similar for both groups of eaters. It was also noted during the research that eating foods did not help relieve stress but actually inhibited
physiological recovery from stress for restrained eaters. However, food consumption may relieve stress by other means such as through redirecting the eater’s feelings of distress to another source (5).

Evilly and Kelly noted differences in the types of foods people under stress tend to consume. Despite differences in total amount of food consumed, both restrained and unrestrained eaters tend to choose less healthy foods when they are experiencing stress. Therefore, even though unrestrained eaters may consume less total calories during periods of increased stress, they may increase their overall consumption of foods that are high in fat, sugar and/or salt (15).

2. Obese vs. Normal Weight: Another theory suggests that normal-weight people and obese people are affected differently by stress; however, this theory does not yet distinguish which group changes their eating habits and which group remains the same (2). Greeno and Wing of the American Psychological Association reviewed eleven studies that compared the stress eating relationship between obese and normal weight individuals. Some of the research they reviewed indicated that obese people are not affected by stress while normal-weight people decrease food intake during periods of stress. Other research suggested that obese people will eat more food when under stress and normal-weight people will not change the amount of food consumed (2). One explanation for the change in food habits may be that stressed individuals may misinterpret their stress as hunger, and therefore consume food when they do not actually need to. Another explanation may be that individuals recognize the comforting features of food and choose to consume foods that give pleasure to help alleviate some of the displeasure caused by the stress.
3. **Men vs. Women**: Some researchers suggest that men and women differ in their food consumption when experiencing stress. Most researchers found that women eat more food during stressful times than men, but once again there are disagreements regarding which group changes their eating habits and which group remains the same. Greeno and Wing outlined the findings from several studies that suggest that women are more likely to eat in response to stress than men (2). However, researchers Grunberg and Straub concluded that when stressed, women do not change their eating habits while men decrease their food consumption (17). The researchers studied college students to determine stress-eating differences between men and women. Half of the subjects watched a pleasant video while half of the subjects watched an unpleasant video. During the video, sweet, salty and bland foods were provided for all of the subjects. The study found that stressed men ate less than unstressed men in all categories of food. However, stressed and unstressed women did not differ from each other nor did they differ from stressed men. In terms of taste preference, many researchers found that women chose to consume significantly more sweet foods when under stress (18). In the Grunberg and Straub study mentioned previously, stressed women ate twice as much sweet food as nonstressed women (17). Wansink, et. al. confirmed this theory in their study which identified women as choosing more snack-related comfort foods and men choosing more hearty comfort foods (9).
Summary

To summarize, the literature review examined stress by looking at the two types of stress, eustress and distress as well as studied stress’s causes (stressors) and effects on the body. The literature review critiqued the different tests that are available for identifying the stress level of an individual including the stressor test, stress symptoms test, stress balancing test and personality test. Finally, the literature review examined the many different methods that counselors have recommended for relieving stress. Counselors have suggested that students change their behavior to reduce the amount of stress in their lives as well as take care of their bodies, have fun and socialize, change the way they think and practice relaxation techniques. Unfortunately, the literature review also recognized that not all students use these healthy methods for reducing stress, and instead they turn to drugs, alcohol, tobacco and/or food to alleviate stress.

After studying stress, we turned our focus to comfort foods that may be used as an unhealthy method for alleviating stress. We analyzed different characteristics of comfort foods and were reminded that each individual will differ in their eating habits and food choices both when stressed and unstressed. Therefore, nutrition counseling needs to be tailored to meet the individual’s needs.

Finally, we combined our research on stress and our research on food to study the stress-eating relationship. We learned about three different stress-eating theories that are still being researched. We looked at restrained eaters versus unrestrained eaters, obese versus normal weight individuals and men versus women in regards to their eating habits when under stress. None of these theories are conclusive enough for use in the field of nutrition.
Conclusion

In conclusion, the stress-eating relationship is a complex one. Although stress and eating patterns are both topics that have been studied extensively, there is little research that connects these two subjects and determines their relationship. In order to understand the potential correlation between the consumption of comfort foods and a high stress level, it is important to identify all of the symptoms of stress, not just eating habits. It is also significant to examine how food and nutrition affect stress in addition to how stress can influence food choices. Many counselors believe that a balanced diet can help eliminate or relieve stress; therefore, dietitians should continue to promote this as another benefit of healthy eating. There are many tools available to measure and reduce stress levels. These are important tools for psychologists as well as nutrition professionals if a relationship between food and stress exists. Dietitians need to be knowledgeable on how to help their patients relieve stress because they may be able to improve their patients’ eating habits by decreasing their stress level. Types of comfort foods are quite varied, so individual differences will need to be taken into account when assessing and treating patients with poor eating choices. Dietitians will need to isolate the characteristics that an individual likes in a comfort food and find healthy foods that fit those characteristics. Certainly if a patient finds sweet, creamy foods to be comforting, there is no reason why they should not be able to consume these foods. The dietitian must work with them to find sweet, creamy foods that are also nutritious such as yogurt, mashed sweet potatoes and pudding. The research on different groups’ responses to stress through eating is not yet conclusive enough to benefit dietitians; however, as further research develops, dietitians should be prepared to utilize this information in their practice.
CHAPTER THREE
METHODOLOGY

Sample

A sample of 315 students at Ball State University in Muncie, Indiana completed a 45 itemized questionnaire (Appendix A). Eleven surveys were eliminated due to obvious duplications or incomplete information, leaving 304 usable surveys. Of the subjects, 280 were female, 23 were male, and 1 subject did not indicate gender. Students were recruited mostly through the Department of Family and Consumer Sciences at the university, as well as other departments. The primary investigator (PI) spoke with various professors at Ball State and arranged to meet with their classes to request that students participate in the survey. Classes were chosen based on their size and willingness of professors to comply. Some professors whose classes were relevant to the material in the study agreed to offer their students extra credit points for completing the survey. All data was directly submitted to statistician, so participants’ anonymity was maintained. Permission was obtained to use a stress test that was created by Dr. Joseph Opatz at the University of Wisconsin (8). Questions were added or omitted as needed to meet the needs of this study. The survey was tested for validity by distributing it to five professionals. Reliability was tested by administering the survey to a sample of thirty students. Permission was obtained from the Institutional Review Board at Ball State University prior to any testing or data collection (Appendix B).
Study Design

The stress-eating survey was posted on the internet by the statistician. Since the survey was online, it is important to note that questions were not actually separated onto two different pages as they are on Appendix A. When recruiting the subjects, the PI distributed slips of paper with the web address of the survey printed on it. Students accessed the survey by going to the given web address and typing in their Ball State username and password to help prevent students from taking the survey more than once. The PI gave instructions to each participating class on how to complete the survey. The surveys were completed online and the data was directly submitted to statistician, Dr. James Jones of University Computing Services. Data was collected during the fall academic semester of 2003. The data was statistically analyzed by the statistician.

Instrumentation

The survey included questions regarding demographics, stress levels and eating habits and food selections when stressed and unstressed.

Data Analysis

Data was analyzed statistically using T-tests, $\chi^2$, cross tabulations, one-way ANOVAs, and Tukey HSD correlations. In addition, percentages and frequencies were computed.
CHAPTER FOUR
RESULTS

Where appropriate, one-way ANOVAs were used to compare group means for several dependent variables, and the assumption of equality of variance was tested for each comparison. If violations of this assumption were found, the Welch test, which is robust with regards to the unequal variances, was used as an alternative to the F test. When a statistically significance difference was found, post hoc pairwise comparisons was made using the Tukey HSD test to control for Type I error. Table 1 shows the distribution of subjects' demographic information.

Eating habits when stressed and unstressed

Although 239 subjects (78.6%) claimed that they typically try to make healthy eating choices, only 99 subjects (32.6%) practiced healthy eating choices when they were stressed. Thus, 60.3% of the 239 subjects did not make this same attempt to eat healthy when they experienced stress. Comfort foods were divided into five categories on the survey, and subjects were asked to select which foods they ate in their typical diet when not stressed and which foods they ate when stressed. Fewer foods were selected in each category of comfort foods for subjects when stressed than when unstressed. This seems contrary to other data in this survey that found that most people experienced an increased appetite when stressed. One explanation may be that the foods included in the survey were more representative of the subjects' typical food selections rather than their comfort foods.
Table 1. Demographic information for subjects.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>College credit hours</strong></td>
<td>n=304</td>
</tr>
<tr>
<td>1-11</td>
<td>9 (3.0%)</td>
</tr>
<tr>
<td>12-16</td>
<td>215 (70.7%)</td>
</tr>
<tr>
<td>17-18</td>
<td>75 (24.7%)</td>
</tr>
<tr>
<td>Over 18</td>
<td>5 (1.6%)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>n=304</td>
</tr>
<tr>
<td>17-21</td>
<td>239 (78.6%)</td>
</tr>
<tr>
<td>22-26</td>
<td>56 (18.4%)</td>
</tr>
<tr>
<td>27-31</td>
<td>4 (1.3%)</td>
</tr>
<tr>
<td>Over 31</td>
<td>5 (1.6%)</td>
</tr>
<tr>
<td><strong>Grade Classification</strong></td>
<td>n=304</td>
</tr>
<tr>
<td>Freshman</td>
<td>48 (15.8%)</td>
</tr>
<tr>
<td>Sophomore</td>
<td>94 (30.9%)</td>
</tr>
<tr>
<td>Junior</td>
<td>97 (31.9%)</td>
</tr>
<tr>
<td>Senior</td>
<td>62 (20.4%)</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>3 (1.0%)</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td>n=304</td>
</tr>
<tr>
<td>Black</td>
<td>12 (3.9%)</td>
</tr>
<tr>
<td>Asian</td>
<td>2 (0.7%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>7 (2.3%)</td>
</tr>
<tr>
<td>White</td>
<td>276 (90.8%)</td>
</tr>
<tr>
<td>Other</td>
<td>7 (2.3%)</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td>n=304</td>
</tr>
<tr>
<td>Single</td>
<td>267 (87.8%)</td>
</tr>
<tr>
<td>Married</td>
<td>17 (5.6%)</td>
</tr>
<tr>
<td>Engaged or Cohabitating</td>
<td>20 (6.6%)</td>
</tr>
<tr>
<td>Divorced</td>
<td>0</td>
</tr>
<tr>
<td>Widowed</td>
<td>0</td>
</tr>
<tr>
<td>Separated</td>
<td>0</td>
</tr>
<tr>
<td><strong>Number of Living Children</strong></td>
<td>n=302</td>
</tr>
<tr>
<td>0</td>
<td>291 (95.7%)</td>
</tr>
<tr>
<td>1</td>
<td>3 (1.0%)</td>
</tr>
<tr>
<td>2</td>
<td>4 (1.3%)</td>
</tr>
<tr>
<td>3</td>
<td>1 (0.3%)</td>
</tr>
<tr>
<td>4 or more</td>
<td>3 (1.0%)</td>
</tr>
<tr>
<td><strong>Living Situation</strong></td>
<td>n=304</td>
</tr>
<tr>
<td>Alone</td>
<td>19 (6.3%)</td>
</tr>
<tr>
<td>With family</td>
<td>38 (12.5%)</td>
</tr>
<tr>
<td>Non-family group</td>
<td>247 (81.3%)</td>
</tr>
<tr>
<td><strong>Employment Status</strong></td>
<td>n=303</td>
</tr>
<tr>
<td>Not employed</td>
<td>111 (36.5%)</td>
</tr>
<tr>
<td>Self employed</td>
<td>3 (1.0%)</td>
</tr>
<tr>
<td>Part time</td>
<td>176 (57.9%)</td>
</tr>
<tr>
<td>Full time</td>
<td>13 (4.3%)</td>
</tr>
</tbody>
</table>
Appetite and Food Choices

As shown in Table 2, nearly 80% (n=243) of the respondents indicated that they experienced some change in appetite when stressed and over half (n=153, 50.3%) experienced an increased appetite when stressed.

Table 2. Subjects’ response to: Do you experience a change in appetite when stressed? (n=304)

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of subjects (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, increased appetite</td>
<td>153 (50.3%)</td>
</tr>
<tr>
<td>Yes, decreased appetite</td>
<td>90 (29.6%)</td>
</tr>
<tr>
<td>No change in appetite</td>
<td>61 (20.1%)</td>
</tr>
</tbody>
</table>

A one-way ANOVA was performed to determine if types of food chosen under stress differed in the groups (increased appetite, decreased appetite, no change). Since the one-way ANOVA showed difference between groups for mixed foods ($F_{(2,301)}=5.47$, $p<.01$) and sweet foods ($F_{(2,301)}=7.46$, $p<.01$), a post hoc comparison (Tukey HSD) was performed. As observed in Tables 3 and 4, the results indicated that subjects with an increased appetite when stressed chose significantly more sweet foods than those with a decreased appetite (mean difference=.59) and those with no change in appetite (mean difference=.82). Subjects with an increased appetite also chose more mixed dishes than those with a decreased appetite (mean difference=.75). However, there was no
significant difference between the types of foods chosen by individuals who experienced increased appetites.

Table 3. Change in appetite and mean (± SD) number of mixed dishes chosen under stress (n=304).

<table>
<thead>
<tr>
<th>Change in appetite under stress</th>
<th>Number of mixed dishes chosen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased appetite</td>
<td>2.54 ± 1.67</td>
</tr>
<tr>
<td>Decreased appetite</td>
<td>1.79 ± 1.63</td>
</tr>
<tr>
<td>No change in appetite</td>
<td>2.34 ± 1.97</td>
</tr>
</tbody>
</table>

Table 4. Change in appetite and mean (± SD) number of sweet dishes chosen under stress (n=304).

<table>
<thead>
<tr>
<th>Change in appetite under stress</th>
<th>Number of sweet dishes chosen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased appetite</td>
<td>2.97 ± 1.59</td>
</tr>
<tr>
<td>Decreased appetite</td>
<td>2.38 ± 1.53</td>
</tr>
<tr>
<td>No change in appetite</td>
<td>2.15 ± 1.63</td>
</tr>
</tbody>
</table>
Appetite changes for restrained and unrestrained eaters, men and women, and obese and normal weight individuals.

Restrained and unrestrained eaters were determined by question #29 on the survey in Appendix A. Subjects were asked how much effort they put forth into controlling their eating and options included examples to help the subjects best identify their level of restraint. Four different levels of eating restraint were recognized with most restrained = 1 and least restrained = 4. The total mean restraint score was $2.67 \pm 0.88$. A one-way ANOVA showed that there was not a statistically significant association between level of restraint and change in appetite when stressed.

One large difficulty in comparing the appetite of men and women in this study is that there were more female subjects (92.4%) than male subjects (7.6%). Taking these percentages into account, it is important to note that a larger percentage of females claimed to experience an increased appetite compared to males. The breakdown of the percentage of each gender experiencing various appetite changes is shown in Table 5.

Table 5. Percentage of females and males reporting changes in appetite.

<table>
<thead>
<tr>
<th>Change in appetite under stress</th>
<th>Number of females (%)</th>
<th>Number of males (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased appetite</td>
<td>145 (51.8%)</td>
<td>7 (30.4%)</td>
</tr>
<tr>
<td>Decreased appetite</td>
<td>82 (29.3%)</td>
<td>8 (34.8%)</td>
</tr>
<tr>
<td>No change in appetite</td>
<td>53 (18.9%)</td>
<td>8 (34.8%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>280 (100%)</strong></td>
<td><strong>23 (100%)</strong></td>
</tr>
</tbody>
</table>
Of the 152 subjects that experienced increased appetite, 95.4% (n=145) of them were females, while a mere 4.6% (n=7) of them were males. The percentage of female and male changes in appetite are compared in Chart 1. When compared to the total percent of female and male subjects stated above, this shows that a larger than expected number of females experienced an increased appetite compared to males. In contrast, to 61 subjects who experienced no change in appetite, 13.1% (n=8) of them were males, while only 86.9% (n=53) of them were females. This would support the hypothesis that women experience an increased appetite when stressed, while men experience no change in appetite. However, the number of males surveyed was so small, that the results were not statistically significant. The Pearson Chi-Square was 4.80, df =2, p=.091, indicating there was no association between appetite changes and gender.

Chart 1. Comparison of the percentage of female and male changes in appetite.
The Body Mass Index (BMI) was calculated for all subjects from reported heights and weights, and the mean BMI of subjects was $23.51 \pm 5.31$. The subjects were then grouped into one of four categories according to their BMI as shown in Table 6.

Table 6. Calculated BMIs from reported heights and weights (n=301).

<table>
<thead>
<tr>
<th>BMI</th>
<th>Number of subjects (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>18 (6.0%)</td>
</tr>
<tr>
<td>&lt;18.5</td>
<td></td>
</tr>
<tr>
<td>Normal weight</td>
<td>216 (71.8%)</td>
</tr>
<tr>
<td>18.5-24.9</td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>42 (14.0%)</td>
</tr>
<tr>
<td>25-29.9</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>25 (8.3%)</td>
</tr>
<tr>
<td>30+</td>
<td></td>
</tr>
</tbody>
</table>

While underweight subjects reported fairly equal responses from all three categories of appetite, as weight increased, a larger percentage of subjects reported an increase in appetite when stressed, with overweight individuals choosing increased appetite the most. However, a Pearson Chi-Square of $6.73$, df=6, $p=.35$ showed that there was no statistically significant association between BMI and change in appetite when stressed.
Chart 2. Percentage of underweight, normal weight, overweight and obese individuals reporting changes in appetite.

Other factors including age, ethnicity, exercise level, vegetarianism and frequency of snacking did not correlate with a change in appetite.
CHAPTER FIVE

DISCUSSION

Implications of this Study and Comparison to Previous Research

This study is unique from other research conducted on the stress-eating relationship because it grouped comfort foods according to their characteristics and examined their consumption in stressed individuals. Other research either did not examine the types of foods chosen during stress or simplified the food choices into two categories, usually salty and sweet. This study did not examine the eating habits of subjects in a clinical setting, thus preventing subjects from acting differently when observed. Instead, the study asked about the subjects' typical eating patterns.

Overall, most subjects (nearly 80%) claimed that they had a change in appetite when stressed with over half of subjects reporting an increase in appetite. While there are a wide variety of responses to stress in regards to appetite, it is clear that the biggest problem is stress-induced eating due to an increased appetite. Dietitians must realize that stress is a potential barrier to healthy eating habits and address the problem accordingly. While 79% of subjects said they typically try to make healthy eating choices, 60% of these subjects claim they deviate from their normal healthy eating habits when they are stressed. This combination of an increase in appetite and less regard for healthy eating behaviors can be harmful to the health of a stressed individual. However, instead of disregarding healthful dietary patterns during times of stress, dietitians can encourage clients to have an increased awareness of their eating habits at this time. Clients can be encouraged to remedy their stress with healthful foods. Individuals can feel better about
themselves and take comfort in the fact that they are treating their body well even when their mind is stressed.

This study showed that individuals who experience an increased appetite when stressed chose significantly more sweet foods than both the decreased appetite and no change in appetite groups. If the sweet characteristic is what stressed individuals look for in comfort foods, it is the role of the dietitian to promote foods that provide sweetness without providing excess fat and calories. Dietitians can promote low-fat pudding instead of ice cream and fruit dipped in chocolate fondue instead of a chocolate candy bar. Subjects with an increased appetite also chose significantly more mixed dishes than those with a decreased appetite. Dietitians can promote portion control of all foods to individuals who may have an increased appetite when stressed.

The results of this study appear to be similar to other studies completed on the stress-eating relationship, but due in part to a lack of male subjects, the results were not statistically significant. When comparing men and women, this study appears to correlate with Greeno and Wing’s findings that suggest women eat more in response to stress than men (2). A larger percentage of women claimed they have an increased appetite when stressed, while a larger percentage of men claimed they do not experience a change in appetite when stressed. This supports the studies that claimed women change their eating habits while stressed and men do not. However, it is important to remember that these changes in appetite were self-reported and not measured. In addition, this study found that a larger percentage of overweight subjects claim to experience an increase in appetite when stressed compared to normal weight and underweight subjects. This is similar to Greeno and Wing’s findings that suggest individuals with higher BMIs eat more when
stressed than individuals with lower BMIs (2). This study does not support the findings of previous research on restrained and unrestrained eaters. This study found no difference between restrained and unrestrained eaters and their eating habits when stressed, unlike other research that claimed restrained eaters consume more food when stressed than unrestrained eaters. Perhaps a better method for determining level of restraint would have given different results.

Although there are correlations gender and weight with appetite changes, it is important to remember that there is still much variation between individuals and their appetite, eating habits, food selection, and stress level. While this information may be helpful when working in a community setting or with large groups of people, individuals should still be counseled according to their individual needs and differences. It is important to find out what characteristics in food an individual finds comforting and work to find healthful foods that have those characteristics. If a person craves salty, crunchy foods when stressed, encourage them to eat pretzels, microwave popcorn, or dill pickles as opposed to high-fat snack chips. It is not necessary to deprive clients of the food characteristics they find comforting; clients can satisfy their cravings through more healthful food options. Finally, it is important to encourage individuals to take care of the stressor in their life, rather than mask their discomfort from stress with comfort from food.
CHAPTER SIX
CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Stress-induced eating is a problem identified by many college students, but it is lacking sufficient scientific research to adequately address the problem. This study attempted to determine if stress-induced eating correlated with gender, eating restraint, or weight, as determined in previous studies. The results of this study found no correlation between changes in appetite and level of eating restraint. It did find differences between men and women in regards to their appetite changes when stressed and differences between underweight, normal weight, overweight, and obese individuals in regards to their appetite changes when stressed. However, these correlations were not significant mostly due to a low number of male participants. One limitation to the study was all data, including heights and weights that were used to calculate BMI, were self-reported.

Recommendations

Nutrition professionals can use this survey and others to aid in evaluating their client’s stress-eating habits and to counsel them according to their findings. The findings of this study and others can be used to predict changes in eating habits for certain groups of people (ex: underweight, overweight, men, women). However, caution should be used when counseling individuals because of the wide variety of responses to stress. Health professionals need to consider the effects of stress on men and women and promote a flexible diet to help reduce the amount of unhealthful stress-induced changes in eating habits. In addition to diet, health professionals should address the source of the stress in individuals so
they can reduce the number of unhealthful eating changes that result from this stress. Collaboration is needed among health professionals to accomplish this. Health education emphasizing stress management and listening to satiety cues should be encouraged to prevent overeating, especially since over half of subjects reported an increased appetite when stressed. Of the subjects that typically try to eat a healthy diet, most of them (60%) do not try to eat healthy when they are stressed. Nutrition professionals should be prepared to help clients select healthful foods that have comforting characteristics for times of stress to help clients maintain their normal healthy eating patterns.

There is still much research that can be done on the topic of stress eating. Can physiological mechanisms explain stress eating or is it solely psychological phenomena that induce stress eating? If there are physiological changes in the body that can account for the changes in eating habits when under psychological stress, what are these physiological mechanisms? This study and others have addressed the problem of stress eating, but health professionals need more information on solutions to these problems. What types of interventions will work on individuals who experience stress-eating? This study looked only at college students. How do college students compare with other groups of people? Is the information in this study only applicable to college students or is it representative of most Americans? This study examined the stress-eating relationship of various weights, genders, and levels of restraint. It also briefly looked at age, ethnicity, exercise level, vegetarianism and frequency of snacking. These factors did not correlate with a change in appetite when stressed, but perhaps there are other factors that correlate with stress-induced eating. More research on any of the topics above would be helpful to health professionals when counseling stressed individuals.
Important Information:

- Although this module may automatically submit your answers prior to the time limit, it is your responsibility to do so by clicking the button at the bottom of this page.

---

The Relationship between Stress and Eating

This survey is completely voluntary and you are free to withdraw at any time by closing this window. All responses are kept confidential.

Personal Information:

1. How many college credit hours are you currently registered for?
   - A. 1-11 credit hours (part time student)
   - B. 12-16 credit hours
   - C. 17-18 credit hours
   - D. over 18 credit hours

2. What is your major?

3. Age:
   - A. 17-21
   - B. 22-26
   - C. 27-31
   - D. over 31

4. What is your classification in school?
   - A. Freshman
   - B. Sophomore
   - C. Junior
   - D. Senior
5. Sex:

○ A. Female
○ B. Male

6. Race/Ethnicity:

○ A. African American / Black
○ B. Asian / Pacific Islander
○ C. Hispanic / Latino
○ D. Native American
○ E. Caucasian / White
○ F. Other (please specify below)

7. Marital Status:

○ A. Single
○ B. Married
○ C. Engaged or Cohabitating
○ D. Divorced
○ E. Widowed
○ F. Separated

8. Number of Living Children:

○ A. None
○ B. 1 child
○ C. 2 children
○ D. 3 children
○ E. 4 or more children

9. Height: __________ ft. __________ in.

10. Weight __________ lbs.

11. Does anyone in your family have a history of the following? (Check all that apply.)

☐ A. Heart Disease
☐ B. Cancer
☐ C. Diabetes
☐ D. Obesity
☐ E. None

12. Do you exercise regularly?
13. Do you live:
   ○ A. Alone
   ○ B. With Family
   ○ C. Non-family group housing (dorm, apartment)

14. What is your current employment status?
   ○ A. Not employed
   ○ B. Self employed
   ○ C. Employed part time
   ○ D. Employed full time

15. Are you currently taking any prescribed medications?
   ○ Yes ○ No

16. Does Ball State University offer counseling for students who are experiencing stress?
   ○ A. yes
   ○ B. no
   ○ C. don't know

Indicate the amount of distress each event currently causes you.

**Family:**

<table>
<thead>
<tr>
<th>In relation to Family.</th>
<th>Does not apply</th>
<th>None</th>
<th>Somewhat</th>
<th>Moderate</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor health or death of family member or close friend.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Major disagreements within family</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Divorce or remarriage of parents.</td>
<td>Does not apply</td>
<td>None</td>
<td>Somewhat</td>
<td>Moderate</td>
<td>Extreme</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------------</td>
<td>------</td>
<td>----------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>Alcoholism or drug problems in family.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holidays, family reunions, or family get-togethers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy in family or gain of new family member</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significant increase or decrease in family income.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Social:**

18. **In relation to Social setting.**

<table>
<thead>
<tr>
<th>Event</th>
<th>Does not apply</th>
<th>None</th>
<th>Somewhat</th>
<th>Moderate</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marriage or starting a significant relationship</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marriage difficulties, divorce, or ending old relationship</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase or decrease in social activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arguments with your roommate(s) or close friend(s).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leading a group or identification as a group leader</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling excluded from a group.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling you are the victim of ethnic, racial, religious, or sexual prejudice.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conflicting interests between socializing, college, and/or work.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Individual:**

19. **In relation to you (Individual).**

<table>
<thead>
<tr>
<th>Event</th>
<th>Does not apply</th>
<th>None</th>
<th>Somewhat</th>
<th>Moderate</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jail term; involved in lawsuit or other court procedure, minor violation of law.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy (to you or caused by you).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improvement or worsening in your state of health.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significant increase or decrease in personal finances.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Sexual difficulties</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in personal habits (smoking, bedtime, mealtime, exercise, recreation, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problems with weight and/or feeling unattractive.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problems with smoking, drugs, or alcohol dependence.</td>
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<tr>
<td>Failure to meet personal goals or obligations.</td>
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<tr>
<td>Vacation and/or travel.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Environment

<table>
<thead>
<tr>
<th>In relation to Environment.</th>
<th>Does not apply</th>
<th>None</th>
<th>Somewhat</th>
<th>Moderate</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current world conflict (ex: terrorism, war, international conflicts, etc.)</td>
<td></td>
<td></td>
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<tr>
<td>Change in quality of living conditions.</td>
<td></td>
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<tr>
<td>Moving away from home, moving to a different town, or moving within the same town.</td>
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<tr>
<td>Noisy or unfriendly roommate(s) and/or neighbors.</td>
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<tr>
<td>Problems with traffic, driving, or parking.</td>
<td></td>
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<tr>
<td>Current Economic condition (ex: high gas prices, cost of rent, tuition, food, etc.)</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Work

<table>
<thead>
<tr>
<th>In relation to Work.</th>
<th>Does not apply</th>
<th>None</th>
<th>Somewhat</th>
<th>Moderate</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ending an old job and/or beginning a new job.</td>
<td></td>
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<tr>
<td>Problems with boss and/or co-</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
### College:

<table>
<thead>
<tr>
<th>In relation to College</th>
<th>Does not apply</th>
<th>None</th>
<th>Somewhat</th>
<th>Moderate</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final or first year of college.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Transfer to different college.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Diminished personal attention from faculty.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Examinations and/or major assignments.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Failure in some course.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Probation, expelled, or quit college.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Change major or difficulties with career decision.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Feel pressured to do well.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Increase or decrease in amount of available free time.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Feelings of boredom, lack of direction and/or uncertain about your future.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

### Eating habits:

23. Are you a vegetarian?

○ Yes ○ No

If yes, what type of vegetarian are you?

○ A. Lacto vegetarian (consumes dairy and plant products)
24. How long have you been a vegetarian?
   ○ A. 0-6 months
   ○ B. 6 months to 1 year
   ○ C. 1-2 years
   ○ D. more than 2 years

25. Do you have regular meal patterns?
   ○ Yes ○ No

26. How many meals do you eat in an average day?
   ○ A. 0-1 meals
   ○ B. 2 meals
   ○ C. 3 meals
   ○ D. 4 or more meals

27. How many snacks do you eat in an average day?
   ○ A. 0 snacks
   ○ B. 1 snack
   ○ C. 2 snacks
   ○ D. 3 snacks
   ○ E. 4 or more snacks

28. Do you take any vitamins or supplements on a regular basis (including protein shakes, calcium supplements, etc.)?
   ○ Yes ○ No
   
   If yes, please specify what you take and how often you take it.

29. How much effort do you put forth to control your eating?
   ○ A. Great effort (ex: limit calorie intake, narrow range of food choices)
   ○ B. Considerable effort (ex: read food labels, sometimes limit food intake)
   ○ C. Some effort (ex: select low-fat or low-sodium foods)
   ○ D. Little or no effort
30. Do you typically try to make healthy eating choices?
   ○ Yes ○ No

31. When you are feeling stressed, do you try to make healthy eating choices?
   ○ Yes ○ No

32. Do you experience a change in appetite when stressed?
   ○ A. Yes, increased appetite
   ○ B. Yes, decreased appetite
   ○ C. No change in appetite

33. Do you do any of the following when stressed? (Check all that apply.)
   □ A. Fast (go without eating)
   □ B. Restrict eating
   □ C. Skip meals
   □ D. Eat smaller portions of food
   □ E. None

34. When you are feeling stressed, does eating food tend to comfort you or relieve the stress?
   ○ Yes ○ No

What foods are typically a part of your diet when you are not under stress?

35. Mixed Dishes: (Check all that apply.)
   □ A. burgers or sandwiches meat items (ex: steak, chicken)
   □ B. pizza
   □ C. casseroles (ex: lasagna)
   □ D. tacos
   □ E. ethnic foods (ex: Chinese, Mexican, Thai food)
   □ F. fast food / restaurants
   □ G. other (please specify below)

36. Salty / Crunchy Foods: (Check all that apply.)
   □ A. potato chips
   □ B. pretzels
   □ C. cheese curls
   □ D. crackers
   □ E. nuts
   □ F. French fries
   □ G. pickles
   □ H. raw vegetables
37. **Sweet Foods:** *(Check all that apply.)*
- A. desserts
- B. chocolate / candy bars
- C. candy
- D. ice cream
- E. muffins / sweet breads
- F. fresh or canned fruit
- G. other (please specify below)

38. **Creamy Foods:** *(Check all that apply.)*
- A. peanut butter and jelly
- B. grilled cheese
- C. soups or stews
- D. pasta (ex: spaghetti, macaroni & cheese)
- E. mashed potatoes
- F. yogurt
- G. applesauce
- H. pudding
- I. other (please specify below)

39. **Beverages:** *(Check all that apply.)*
- A. coffee
- B. soda
- C. tea
- D. hot beverages
- E. alcohol
- F. other (please specify below)

40. Do you do any of the following when *not stressed?* *(Check all that apply.)*
- A. Fast (go without eating)
- B. Restrict eating
- C. Skip meals
- D. Eat smaller portions of food
- E. None

When stressed, which foods do you turn to?

41. **Mixed Dishes:** *(Check all that apply.)*
A. burgers or sandwiches meat items (ex: steak, chicken)
B. pizza
C. casseroles (ex: lasagna)
D. tacos
E. ethnic foods (ex: Chinese, Mexican, Thai food)
F. fast food / restaurants
G. other (please specify below)

42. Salty / Crunchy Foods: (Check all that apply.)
A. potato chips
B. pretzels
C. cheese curls
D. crackers
E. nuts
F. French fries
G. pickles
H. raw vegetables
I. other (please specify below)

43. Sweet Foods: (Check all that apply.)
A. desserts
B. chocolate / candy bars
C. candy
D. ice cream
E. muffins / sweet breads
F. fresh or canned fruit
G. other (please specify below)

44. Creamy Foods: (Check all that apply.)
A. peanut butter and jelly
B. grilled cheese
C. soups or stews
D. pasta (ex: spaghetti, macaroni & cheese)
E. mashed potatoes
F. yogurt
G. applesauce
H. pudding
I. other (please specify below)
45. **Beverages**: (Check all that apply.)
- A. coffee
- B. soda
- C. tea
- D. hot beverages
- E. alcohol
- F. other (please specify below)

For one's rights as a research subject, the following person may be contacted: Ms. Sandra Smith, Coordinator of Research Compliance, Office of Academic Research and Sponsored Programs, Ball State University, Muncie, IN 47306. (765) 285-5070.

46. If you are eligible to receive extra credit, please enter your name

and your course number and section.
The Institutional Review Board has recently approved your project titled *The Relationship between Stress and Eating* as originally submitted as an exempt study. Such approval is in force from October 2, 2003 to October 1, 2004.

It is the responsibility of the P.I. and/or faculty supervisor to inform the IRB:

- when the project is completed, or
- if the project is to be extended beyond the approved end date,
- if the project is modified,
- if the project encounters problems,
- if the project is discontinued.

Any of the above notifications should be addressed in writing to the Institutional Review Board, c/o the Office of Academic Research & Sponsored Programs (2100 Riverside Avenue). Please reference the above identification number in any communication to the IRB regarding this project. Be sure to allow sufficient time for extended approvals.

pc: Jay Kandiah


7. http://www.bsu.edu/students/cpsc


11. http://www.jhu.edu/~hr1/fasap/stress


